cannula. The method **149** may further include sealing **158** a second section of the enclosure to the first section at least on part of the at least one edge.

[0393] Referring now to FIG. **59**, method **249** for manufacturing an enclosure can include, but is not limited to including, attaching **252** an adapter to a first section of an enclosure. The first section may have a first side, a second side, and at least one edge. The attachment may form a fluid/liquid-tight seal. The method **249** may further include penetrating **254** the first section through the adapter in a plurality of locations. The plurality of locations may each have at least one tubing interface surrounding each of the plurality of locations. The tubing interface may be a barbed fitting or a locking interface such as a luer lock for non-limiting example. The method **249** may further include coupling **256** a plurality of tubes to each of the plurality of locations. The plurality of tubes may each have a first end and a second end. The first end may host a fluid conduit and the second end may host a fluid conduit. The fluid conduit in the first end may be continuous with the fluid conduit in the second end. Alternatively, the first end may host a cannula and the second end may host a cannula. The method **249** may further include sealing **258** a second section of the enclosure to the first section at least on part of the at least one edge. The method **249** may further include inserting **260** a biological specimen between the first section and the second section. The method **249** may further include placing **262** at least one of the fluid conduits into fluid communication with the biological specimen. This may include introducing the fluid conduit into the biological specimen. Alternatively, the method **249** may include introducing at least one of the cannulae into the biological specimen. The method **249** may further include completely sealing **264** the first section to the second section.

[0394] Referring now to FIG. **60**, method **600** can be used to manufacture a fluid pumping cassette for tissue engineering. Method **600** may include forming **602** a base including a depression having chamber walls. Optionally, forming **602** a base may include forming a base with a depression having at least one limit structure or spacer disposed upon the chamber walls. The method **600** may include forming **604** valves, and a number of fluid ports. The fluid ports may include at least one fluid port which enables extracellular matrix isolating or recellularizing fluid to be admitted to the cassette, a reservoir fluid inlet, at least one waste port, and a number of fluid loop ports. The at least one fluid port which enables extracellular matrix isolating or recellularizing fluid to be admitted to the cassette may be a specimen fluid port. The method **600** may include forming **606** at least one fluid pathway which places the depression, valves, and fluid ports in fluid communication with one another. This fluid communication may be selective or interruptible fluid communication. For example, forming **606** the at least one fluid pathway may include forming the at least one fluid pathway such that valves allow various regions of the cassette to be fluidically isolated from one another if desired. The method **600** may include attaching **608** a flexible membrane to the base. The flexible membrane and chamber walls may define a pump chamber. The at least one limit structure may be constructed and positioned to defined the shape of the membrane at its greatest excursion into the depression and to create a chamber trap volume.

[0395] Still referring to FIG. **60**, the method **600** may also include attaching fluid conduits to each of the fluid ports. The method **600** may include attaching a specimen fluid conduit to each of at least one specimen port. The specimen fluid conduit(s) may include a specimen fluid conduit end which is configured to interface with an enclosure or tissue engineering bioreactor or alternatively with a biological specimen.

[0396] Referring now to FIG. **61**, an example method **620** which may be used for manufacturing a tissue engineering set is depicted. The method **620** may include, but is not limited to including, forming **622** at least one reservoir for tissue engineering. Forming **622** at least one reservoir may include forming the at least one reservoir with an inlet and an outlet port. The method **620** may include forming **624** a tissue engineering bioreactor sized to hold a desired biological specimen. Forming **624** the tissue engineering bioreactor may include forming the tissue engineering bioreactor with at least one fluid port and an adapter. The adapter may allow for fluid conduits to access an interior volume of the tissue engineering bioreactor in which the desired biological specimen is held. The method **620** may include forming **626** a first cassette including a first source port in communication with a first source line and at least one secondary source port in communication with at least one secondary source line. Forming **626** the first cassette may include forming the first cassette with a first pump chamber, at least one fluid pathway, and at least one valve managing the routing of fluid through the first cassette. Forming **626** the first cassette may include forming the first cassette with a reservoir port in communication with a reservoir inlet conduit coupled to an inlet port of the at least one reservoir. The method **620** may include forming **628** a second cassette including a pump chamber, at least one fluid pathway, and at least one valve managing routing of an extracellular matrix isolating or recellularizing fluid through the second cassette. Forming **628** the second cassette may include forming the second cassette with a reservoir inlet port in communication with a reservoir outlet conduit leading to an outlet port of the at least one reservoir. Forming **628** the second cassette may include forming the second cassette with a tissue engineering bioreactor interface port in communication with a bioreactor conduit leading to or into the tissue engineering bioreactor. In some configurations, method **620** may include forming a plurality of such second cassettes. The method **620** may include packaging **630** at least one reservoir, tissue engineering bioreactor, first cassette, and second cassette together to form a tissue engineering fluid handling set.

[0397] Various alternatives and modifications can be devised by those skilled in the art without departing from the disclosure. Accordingly, the present disclosure embraces all such alternatives, modifications and variances. Additionally, while several configurations of the present disclosure have been shown in the drawings and/or discussed herein, the disclosure is not limited thereto. Therefore, the above description should not be construed as limiting, but merely as exemplifications of particular configurations. And, those skilled in the art will envision other modifications within the scope and spirit of the claims appended hereto. The present teachings are also directed to a system and methods that can be executed in hardware, firmware, and/or software for accomplishing the methods discussed herein, and, possibly, computer readable media storing software for accomplishing these methods and system. The various modules described herein can be provided in conjunction with a single CPU, or on an arbitrary number of different CPUs.